Determinants of Medication Adherence in Hypertension Patients in Level I Health Facilities in Kembaran District

Silma Kaaffah[1], [*], Galih Samodra[2], Yulinda Eka Pratiwi[3]
[1,2,3]Universitas Harapan Bangsa, Kembaran, Banyumas and 53181, Indonesia
[1]silma@uhb.ac.id*; [2]galihsamodra@uhb.ac.id; [3]yulindaekapratiwi84@gmail.com

ABSTRACT

Medication adherence is the key to controlling blood pressure in hypertensive patients to minimize the risk of complications. The research aims to assess level of medication adherence and identify influencing factors. The quasi-experimental research method used purposive sampling to create a control group and 2 intervention groups (pill box and medication chart) with each group 30 patients. Prospective data collection with pre-post design (week-1 and week-4) as well as observing clinical data on blood pressure, medication adherence. Questionnaire of medication non-adherence determinants was taken at week 4. The questionnaire instrument was validated with Cronbach Alpha reliability >0.06. The results of the statistical analysis were significant (p-value <0.05) with increasing the mean score of medication adherence in the pill box was 1.2 and the medication chart was 0.7. The reduction in systolic blood pressure in the intervention group was significant (p-value <0.05) by more than 2 mmHg. A total of 35.6% of patients were reluctant to ask health workers for medication information and 45.6% needed someone to remind them to take medication. In conclusion, increasing medication adherence and reducing blood pressure can be achieved with intervention and requires social support from family and health-care professional.

Keywords: hypertension, blood pressure, medication adherence

1. INTRODUCTION

Hypertension is the leading cause of premature death worldwide and is estimated to affect 33% of adults aged 30-79 years, significantly doubling between 1990 and 2019 from 650 million to 1.3 billion (Zhou et al., 2021). Hypertension is a condition of systolic blood pressure (TDS) ≥140 mmHg or diastolic blood pressure (TDD) ≥90 mmHg when measured at a health facility or taking hypertension medication(Perhimpunan Dokter Hipertensi Indonesia (PERHI), 2021; World Health Organization, 2023). Data from the World Health Organization states that hypertension, which is a chronic disease, is only 1 in 5 adults (21%) with controlled hypertension(World Health Organization,

2023). The Basic Health Research Report (RISKESDAS) in 2018 stated that the prevalence of hypertension reached 34.1% in Indonesia in the productive age population ≥ 18 years and only half of the patients (54.4%) routinely took antihypertensive drugs (Riskesdas Kementrian Kesehatan RI, 2018). Data from the Central Java Provincial Health Office stated that 30.4% of the total population aged ≥ 15 years suffered from hypertension (Dinkes, 2021) and in Banyumas Regency in 2022 there were 181,498 people with hypertension from a total of 27 sub-districts (Dinkes, 2022).

One of the problems in patients with chronic diseases such as hypertension is adherence, which requires lifestyle modification and long-

*Silma Kaaffah.
Tel.: -
Email: silma@uhb.ac.id

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

term therapy (Sammulia, S.F., et.al., 2016). Patients who take more than one medication with varying frequency of drinking rules increase the risk of non-adherence and several other factors are associated with non-adherence to medication. Previous studies mentioned the risk factors of increasing number of medications, living in the city, forgetting the dosage rules and low energy are associated with non-adherence in adult hypertensive patients (Nikolic, A., et.al., 2023). Non-adherence to hypertension treatment can lead to uncontrolled blood pressure (Unger, T., 2020). Factors such as gender, age, place of residence, presence of comorbidities, knowledge of the disease, type of treatment, long waiting time for drugs in health facilities, the relationship between patients and medical personnel through effective counseling on antihypertensive drugs have an influence on patient compliance behavior (Getenet, A., 2019; Noreen, N., 2023).

Previous research in the city of Yogyakarta qualitatively showed that the description of hypertension patients' perceptions of adherence to taking medication is an effort to maintain self-health conditions based on the desire to recover and efforts to recover (Gibran et al., 2021). Another study in Kertasura City, Central Java Province using qualitative methods has identified factors that influence treatment adherence in hypertensive patients, namely health workers also have a role as a cause of non-adherence to treatment for hypertensive patients in the Kartasura Health Center area besides the individual factors themselves (Pramesti et al., 2020).

Research related to antihypertensive treatment compliance interventions in Iran shows that pill boxes can significantly improve compliance in the intervention group (Mehdinia, A., 2020). Another study states that patients who use medication charts tend to take their medication more regularly, thereby increasing the success of therapy compared to the control group (Krisna, et.al., 2020). Assessment using these methods is only assessed and observed based on patient compliance which still provides a risk of subjectivity in the study results.

Further research is needed to find the most appropriate protocol to improve compliance. Based on the results of interviews with health

workers at the Kembaran I Health Center in Banyumas Regency conducted before the study began in July 2023, the number of hypertensive patients as of January 2023 was 3,350 people with an average blood pressure value of more than 160/100 mmHg. Ideally, hypertension patients should have a blood pressure target of less than 140/90 mmHg for hypertension without comorbidities and less than 130/80 mmHg for high-risk patients with complications (Perhimpunan Dokter Hipertensi Indonesia (PERHI), 2021). Efforts to improve medication adherence need to be made by providing interventions in the form of pill boxes and medication charts. So far, there are still limited studies on evaluating compliance improvement by assessing clinical blood pressure outcomes and looking at factors that influence treatment non-compliance, so researchers are interested in conducting this study.

2. METHODS

The research has been declared ethically feasible by the Health Research Ethics Commission of Harapan Bangsa University with number B. LPPM-UHB/2302/09/2023. The sample size was 90 patients of Kembaran I Health Center using purposive sampling technique. Patients were grouped into 3 groups: control group, pill box intervention group and medication chart intervention group. Measurement of adherence levels using the MGL-MAQ (Morisky, Green, Levine Medication Adherence Questionnaire) questionnaire with 4 questions that have been translated into Indonesian and have been validated by previous researchers (Ernawati & Rahmatul Islamiyah, 2019; Hening et al., 2019). The questionnaire on the determinants of hypertension patient treatment adherence was adapted from Makkulawu, et al., 2018 (Makkulawu et al., 2018) and has been tested for validity and reliability with reliable results of Cronbach's alpha> 0.06. The validity test shows that out of 34 questions only 26 questions are valid. The data that had been collected were tabulated and analyzed using SPSS 26.0 to see descriptive results in the form of percentages as well as bivariate tests to assess significance between groups. Chi-square bivariate analysis was used to describe the sociodemographic and clinical characteristics

340

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

of patients on the level of medication adherence. The dependent t-test and Wilcoxon test were used to assess the comparison of medication adherence scores and blood pressure between groups before and after treatment, while the mann whitney test examined the mean change in adherence scores and blood pressure between groups. Data normality test by assessing the significance of Kolmogrov Smirnov (p-value>0.05). The results of the age data analysis are not normal because the p-value <0.0001.

3. RESULT AND DISCUSSION

3.1 Comparative Analysis of Demographic Characteristics on Adherence.

Based on table 1 with a total of 90 patients, the female gender category is more dominant than male patients, 62.2% and 37.8% respectively. The majority of education level is low (elementary - junior high school) reaching 72.2% and is significant to the level of compliance with a p-value <0.05.

3.2 Comparative Analysis of Clinical Characteristics on Adherence.

Clinical characteristics of hypertensive patients in table 2 with a disease duration of more than 3 years reached 55.6% 70% had no comorbidities, 70% did not smoke. Most patients 53.3% do not exercise, 31% do not do a salt diet and 12.2% consume herbal medicine. Based on table 2, only the intervention variable of medication reminder media is significant to the level of compliance with p-value <0.05. Tables 1 and 2 show that the variables of gender, age, occupation, duration of disease, comorbidities, salt diet, smoking behavior, body mass index (BMI), use of herbal medicine, and number of drugs have no significant difference in the level of compliance with p-value> 0.05.
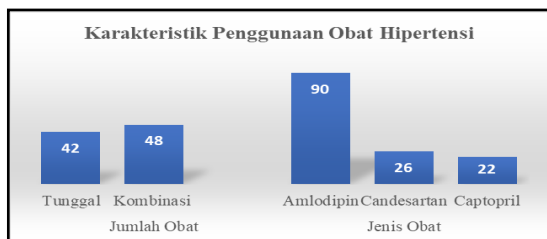

Figure 1. Characteristics of Hypertension Medication

Based on Figure 1, hypertension drugs consumed by patients are dominated by the use of combination drugs (the use of 2 or more drugs) reaching 48 patients.

Table 1. Comparative Analysis of Patient Demographic Characteristics on Adherence

Variables	Total Sample (n=90)		Compliance Level			p-value
	Category	n (%)	High (n = 18)	Medium (n = 66)	Low (n = 6)	
			n (%)	n (%)	n (%)	
Gender	Male	34 (37.8%)	5 (14.7%)	26 (76.5%)	3 (8.8%)	0.543
	Female	56 (62.2%)	13 (23.2%)	40 (71.4%)	3 (5.4%)	
Age (years)	40-60	50 (55.6%)	14 (28%)	32 (64%)	4 (8%)	0.073
	>60	40 (44.4%)	4 (10%)	34 (85%)	2 (5%)	
Education	High	25 (27.8%)	10 (40%)	15 (60%)	0 (0%)	0.007
	Low	65 (72.2%)	8 (12.3%)	51 (78.5%)	6 (9.2%)	
Jobs	Nor Working	75 (83.3%)	12 (16%)	57 (76%)	6 (8%)	0.073
	Working	15 (16.7%)	6 (40%)	9 (60%)	0 (0%)	

All hypertensive patients used amlodipine as the first line of hypertension therapy. The results showed that the level of compliance in the high category at week 4 was only 20% (18) and 73.3% (66) of patients with moderate category.

3.3 Comparative Analysis of Mean Change in Pre-Posttest Values Between Groups on Adherence and Blood Pressure Levels.

341

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

Mann-Whitney statistical test analysis assessed changes in the mean MGL-MAQ score after the intervention compared to the control group with a p-value <0.001. Comparison of the average decrease in TDS and TDD values of the pill box group and the control group there is a difference with a p-value <0.05. The medication chart group and the control group had no significant difference.

(p-value >0.05) on TDD but significant on TDS (p-value 0.010)..

3.4 Comparative Analysis of Pre and Postest Intergroup Blood Pressure and Compliance

Based on Table 3, the mean values of TDS and TDD of the pill box group before the intervention and after the intervention were different with a p-value of <0.001. The medication chart group was only significant in TDS (p-value 0.007) while the mean TDD was not significant with a p-value of 0.099. The control group for the mean value of TDS was not significant but there was a difference in TDD pre and posttest with a p-value of 0.010. Comparison of the pre and posttest MGL-MAQ mean scores of the pill box and medication chart intervention groups showed a difference in increasing compliance with a p-value of <0.05 each.

Table 2. Comparative Analysis of Patient Clinical Characteristics on Compliance.

Variable	Total Sample (n=90)		MGL-MAQ Compliance Level			P-value
	Category	n (%)	High	Medium	Low	
			(n = 18)	(n = 66)	(n = 6)	
			n (%)	n (%)	n (%)	
Duration of Disease						
	> 3 years	40 (44.4%)	9 (22.5%)	27 (67.5%)	4 (10%)	0.415
	> 3 years	50 (55.6%)	9 (18%)	39 (78.0%)	2 (4%)	
Comorbidities						
None	63 (70%)	12 (19%)	47 (74.6%)	4 (6.3%)	0.917
Available	27 (30%)	6 (22.2%)	19 (70.4%)	2 (7.4%)	
Salt Diet						
	Doing	59 (65.6%)	11 (18.6%)	45 (76.3%)	3 (5.1%)	0.606
	Not Doing	31 (34.4%)	7 (22.6%)	21 (67.7%)	3 (9.7%)	
Perilaku Merokok						
	No Smoking	79 (87.8%)	15 (19%)	59 (74.7%)	5 (6.3%)	0.740
	Smoking	11 (12.2%)	3 (27.3%)	7 (63.6%)	1 (9.1%)	
IMT Category						
	Skinny (< 18.4)	1 (1.1%)	0 (0%)	1 (100%)	0 (0%)	
	Normal (18.5-25)	72 (80%)	12 (16.7%)	56 (77.8%)	4 (5.6%)	0.319
	Fat (>25)	17 (18.9%)	6 (35.3%)	9 (52.9%)	2 (1.1%)	
Sports						
	Doing	42 (46.7%)	7 (16.7%)	34 (81%)	1 (2.4%)	0.199
	Not Doing	48 (53.3%)	11 (22.9%)	32 (66.7%)	5 (10.4%)	
Herbal Medicine						
	No Consumption	79 (87.8%)	14 (17.7%)	61 (77.2%)	4 (5.1%)	0.064
	Consumption	11 (12.2%)	4 (36.4%)	5 (45.5%)	2 (18.2%)	
Amount of medicine						
	Single	42 (46.7%)	12 (28.6%)	28 (66.7%)	2 (4.8%)	0.150
	Combination	48 (53.3%)	6 (12.5%)	38 (79.2%)	4 (8.3%)	
Intervention						

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

	Availa ble	60 (66. 7%)	17 (28. 3%)	43 (71. 7%)	0 (0%)	<0. 000 1
	None	30 (33. 3%)	1 (3.3 %)	23 (76. 7%)	6 (20 %)	

3.5 Comparative Analysis of Pre and Postest Intergroup Blood Pressure and Compliance

The results of the validation test of the questionnaire determinants of treatment non-compliance behavior, out of 34 questions there were 26 valid questions (r-count> r-table (0.207)) and Cronbach alpha test 0.837 (>0.6). Questions were categorized into 4, namely patient factors (eating habits, beliefs about treatment and health services, emotional and physical), disease factors (complications and symptoms felt), health service factors (facilities, health workers and drugs) and finally social and cultural economic factors (social support and costs). Patient factors regarding eating habits, 88 patients (97.8%) disagreed with the statement "My diet is irregular so I feel I don't need to take antihypertensive medication" (code K1). External factors in the health service category, in the question with code K23 related to social support, there were 35.6% or 32 patients felt reluctant to ask information related to drugs to health workers and code K24 there were 45.6% (41 patients) wanted someone to remind them when they started to be non-compliant with taking medication.

4. DISCUSSION

To date, no research study has been found on the determinants of factors affecting treatment adherence of hypertension patients in first-level facilities by assessing socioemographic characteristics and patient clinical outcomes on treatment adherence as well as media interventions for medication reminders on clinical outcomes. In addition, an interview of behavioral determinants of reasons for non-adherence to hypertension treatment was completed, looking at internal and external factors. Important factors in this study that influence hypertension patients' medication adherence related to demographics, namely higher education and the influence of interventions related to the provision of pill boxes and medication charts in hypertension

patients. The results of this study show that patients with high education levels affect the level of medication adherence compared to low education levels, this is in line with previous research in Pakistan (Noreen, N., 2023).

Table 3. Comparative Analysis of Patient Clinical Characteristics on Adherence

Group	Systolic Blood Pressure		P-value
	Pre test	Post test	
	(Mean±SD)	(Mean±SD)	
Pill Box	155.13±18.39	152.30±17.23	<0.001[a]
Medication Chart	152±21.98	150.30±20.85	0.007[a]
Control	147.10±18.25	147±17.65	0.811[a]
Group	**Diastolic Blood Pressure**		**P-value**
Pill Box	82.87±10.65	78.63±9.09	<0.001[b]
Medication Chart	82.77±10.49	81±10.49	0.099[a]
Control	82.17±10.63	80.10±8.68	0.010[b]
Group	**Compliance Score**		**P-value**
Pill Box	2.07±1.17	3.27±0.58	<0.001
Medication Chart	2.10±1.06	2.87±0.68	0.003
Control	2.03±1.37	2.07±0.94	0.782

*Description: aResults of dependent t-test, bResults of Wilcoxon test

The results of the study are not the same as the results of research in China (Pan, J., 2019), namely in the variables of gender and length of illness there is significance for treatment adherence and studies from Ethiopia also show significance only in the variables of age and comorbidities as important predictors of treatment adherence (Getenet, A., 2019). This may occur due to differences in the sociodemographics of the country and the diversity of the people who participated as research respondents..

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

The effect of interventions related to the provision of pill boxes and medication charts on hypertensive patients in this study. Patients who were not given any intervention did not have an increase in compliance and a significant decrease in blood pressure. In line with the results of previous studies, control patients without intervention were 2.4 times more likely to forget to take medication than patients who used pill box media (Pui & Choi, 2019). The patient's blood pressure value in this study decreased after being given a media intervention reminder to take medicine, namely pill boxes and medication charts. Pill box is a medicine box that contains the amount of medicine that must be consumed by patients every time they take medicine (Burnier & Egan, 2019). The pill box comes in various types such as daily pill box, weekly pill box, four times weekly pill box. Pill boxes can reduce the cost of therapy and improve the quality of life of patients so that it can help patients who require long-term consumption of drugs such as hypertension (Li et al., 2021). Pill box aids in this study increased adherence and reduced systolic-diastolic blood pressure significantly and in line with research conducted in other cities (Sammulia, S.F., et.al., 2016). Age factors affect adherence, as being young or elderly affects the acceptability of treatment (Burnier & Egan, 2019). Elderly patients may have visual impairment or other illnesses, but looking at the pill box is easier than ticking off a column on a paper medication chart. These visual reasons affect information comprehension, memory and may also affect expectations or attitudes towards medication (Burnier & Egan, 2019). Medication chart is a paper tool to help patients overcome forgetting to take medication, by ticking the available column after the patient takes the medicine. Medication charts can statistically improve medication adherence but do not reduce diastolic blood pressure. Based on brief interviews with patients, some patients complained of technical difficulties in recording the use of drugs with medication charts, especially the elderly were less effective in carrying out their therapy, because they had to mark the medication chart after taking the medicine and thus had to look for a pen which was quite inconvenient. Another cause is the risk of being scattered, lost or wet and torn (Sammulia, S.F., et.al., 2016). Previous studies in two different cities in Yogyakarta and Batam city showed similar results medication chart intervention increased adherence but did not improve clinical outcomes (Sammulia, S.F., et.al., 2016). Non-adherence to antihypertensive therapy was significantly associated with an increased risk of the primary clinical outcome of blood pressure in hypertensive patients (Jung et al., 2023). In addition to non-compliance, blood pressure results can also be influenced by several factors including changes in position and differences in position during examination. The diastolic blood pressure value when the patient is in a sitting position will be higher than the position when the patient is supine with the difference in value reaching 5 mmHg (Jatinugroho & Lontoh, 2021). Blood pressure readings can also be higher when patients support their own arms. When the patient is seated and the back is not properly supported by the chair, the diastolic pressure reading can increase by 6 mmHg. The changing position of the arm plays a role in the error of blood pressure values. When the arm is below the level of the heart, the value will be too high while when the arm is above the level of the heart, the value will be lower and for every inch the arm is above or below the level of the heart there is a difference of 2 mmHg (Jatinugroho & Lontoh, 2021; Unger, T., 2020). Based on the results of this study, we found that 1 in 3 patients still need counseling from a health professional and help to remind them to take their hypertension medication. Additional counseling, involvement of family members, or repeated instructions to ensure patient understanding are key to helping patients with low literacy levels when these services are provided by doctors, pharmacists, or nurses. Effective communication skills during the treatment period can empower patients to engage in disease management and are strongly correlated with improved treatment adherence (Legido-Quigley et al., 2019).

This study has several limitations, firstly it was only taken at one primary healthcare facility so the patients are not representative of the general population and hence it may be difficult to generalize the findings to the population. We overcame this by taking all hypertensive patients at the health center and digging deeper into the factors of non-

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

adherence using a validated questionnaire that has been published by previous researchers. Secondly, the limitation of researchers not directly observing the use or when patients take antihypertensive drugs as well as the potential bias of self-reporting in the adherence questionnaire. The questionnaire was completed at one time and the researcher accompanied the patient when filling out the questionnaire and emphasized honesty to the patient. All questions in the questionnaire are easy to understand and have been validated and reliable to minimize self-reporting and there is another evaluation, namely assessment by calculating the remaining drugs in the pill box and medication chart. Another limitation is that we have not analyzed in depth to multivariate what factors have the most influence on medication non-adherence. The possibility of educational factors interacting with access to information and social support has not been studied further, so more in-depth research is needed. Counseling interventions provided by pharmacists to hypertensive patients on an ongoing basis, periodic counseling by medical personnel and support for lifestyle changes are needed in order to improve therapeutic adherence and achieve controlled blood pressure targets. (Burnier & Egan, 2019; Gamage et al., 2020)

CONCLUSION

Coverage of medication adherence levels in the high category is still low. The intervention of media reminders to take medication and education level affect patient medication adherence. Social support from family and involvement of medical personnel in the treatment period of hypertension patients are needed to improve medication adherence. Many factors are associated with medication non-adherence. Further research such as multivariate analysis to see what factors are most influential on hypertension treatment adherence and research is needed to find the most appropriate protocol to improve adherence..

ADVISE

Health education strategies specifically focused on adherence should be designed and delivered to hypertensive patients and the public at large..

REFERENCES

Burnier, M., & Egan, B. M. (2019). Adherence in Hypertension: A Review of Prevalence, Risk Factors, Impact, and Management. *Circulation Research*, *124*(7), 1124–1140.https://doi.org/10.1161/CIRCRESAHA.118.313220

Dinkes. (2021). Profil Kesehatan Provinsi JawaTengah Tahun 2021. In *Profil Kesehatan Provinsi JawaTengah Tahun 2021*. https://dinkesjatengprov.go.id/v2018/dokumen/Profil_Kesehatan_2021/mobile/index.html

Dinkes. (2022). *Profil Kesehatan kabupaten Banyumas tahun 2022*. Dinas Kesehatan Kabupaten Banyumas. https://dinkes.banyumaskab.go.id/news/42432/profil-kesehatan-kabupaten-banyumas-tahun-2022

Ernawati, I., & Rahmatul Islamiyah, W. (2019). p-ISSN: 2502-647X; e-ISSN: 2503-1902. *Uji Validitas Dan Reliabilitas Kuesioner Kepatuhan MGLS (Morisky, Green, Levine Adherence Scale) Versi Bahasa Indonesia Terhadap Pasien Epilepsi*, *4*(2), 305–313.

Gamage, D. G., Riddell, M. A., Joshi, R., Thankappan, K. R., Chow, C. K., Oldenburg, B., Evans, R. G., Mahal, A. S., Kalyanram, K., Kartik, K., Suresh, O., Thomas, N., Mini, G. K., Maulik, P. K., Srikanth, V. K., Arabshahi, S., Varma, R. P., Guggilla, R. K., D'Esposito, Thrift, A. G. (2020). Effectiveness of a scalable group-based education and monitoring program, delivered by health workers, to improve control of hypertension in rural India: A cluster randomised controlled trial. *PLoS Medicine*, *17*(1). https://doi.org/10.1371/journal.pmed.1002997

Getenet, A., E. al. (2019). Determinants of adherence to anti-hypertensive medications among adult hypertensive patients on follow-up in Hawassa Referral Hospital: A case–control study. *JRSM Cardiovascular Disease*, *8*,

345

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

204800401989275.https://doi.org/10.117
7/2048004019892758

Gibran, N. C., Perwitasari, D. A., Hayati, E. N., & Dahlan, U. A. (2021). Persepsi Pasien Hipertensi Tentang Kepatuhan Minum Obat Di Instalasi Rawat Jalan Rs Pku Muhammdiyah Yogyakarta : Studi Kualitatif. *Medical Sains : Jurnal Ilmiah Kefarmasian*, *5*(2), 167–180. https://doi.org/10.37874/ms.v5i2.197

Hening, W., Sartika, R. D., & Sauriasari, R. (2019). Effect of hospital pharmacist counseling on clinical outcomes of type 2 diabetes mellitus outpatients. *Journal of Research in Pharmacy Practice*, *8*(3), 155.https://doi.org/10.4103/jrpp.jrpp_19_67

Jatinugroho, Y. D., & Lontoh, S. O. (2021). Pengaruh perubahan posisi terhadap tekanan darah pada karyawan dan karyawati RSU Purwogondo. *Tarumanagara Medical Journal*, *3*(1), 192–199. https://doi.org/10.24912/tmj.v3i2.11762

Jung, M., Choo, E., & Lee, S. (2023). A comparison of methods for the measurement of adherence to antihypertensive multidrug therapy and the clinical consequences: a retrospective cohort study using the Korean nationwide claims database. *Epidemiology and Health*, *45*, 1–10. https://doi.org/10.4178/epih.e2023050

Krisna, et.al. (2020). *The Role Of Medication Reminder Technology As An Enhancement Of Patients Compliance. July*.https://doi.org/10.31838/ijpr/2020.S P1.052

Legido-Quigley, H., Naheed, A., Asita De Silva, H., Jehan, I., Haldane, V., Cobb, B., Tavajoh, S., Chakma, N., Kasturiratne, A., Siddiqui, S., Jafar, T. H., Clemens, J. D., Hasnat, M., Hameed, A., Khan, A. Z., Ranasinha, C., Fin-Kelstein, E., Bilger, M., Pryseley, A., … Turner, E. (2019). Patients' experiences on accessing health care services for management of hypertension in rural Bangladesh, Pakistan and Sri Lanka: A qualitative study. *PLoS ONE*, *14*(1), 1–23. https://doi.org/10.1371/journal.pone.021

1100

Li, Y., Liu, G., Liu, C., Wang, X., Chu, Y., Li, X., Yang, W., Shen, Y., Wu, F., & Zhang, W. (2021). Effects of Pharmacist Intervention on Community Control of Hypertension: A Randomized Controlled Trial in Zunyi, China. *Global Health Science and Practice*, *9*(4), 890–904. https://doi.org/10.9745/GHSP-D-20-00505

Makkulawu, A., Setiadi, A. P., Budi, T., Rahardjo, W., & Setiawan, E. (2018). The Development of a Questionnaire on Factors Affecting Non Adherence Behavior among Indonesian Elderly Population. *Pharmaceutical Sciences and Research*, *5*(2), 49–57. https://doi.org/10.7454/psr.v5i2.3881

Mehdinia, A., E. al. (2020). The Effect of Pillbox Use on Medication Adherence Among Elderly Patients: A Randomized Controlled Trial. *International Electronic Journal of Medicine*, *9*(1), 38–43. https://doi.org/10.34172/iejm.2020.07

Nikolic, A., et.al. (2023). Predictors of Non-Adherence to Medications in Hypertensive Patients. *Iranian Journal of Public Health*, *52*(6), 1181–1189. https://doi.org/10.18502/ijph.v52i6.12960

Noreen, N., E. al. (2023). Determinants of Adherence to Antihypertension Medications Among Patients at a Tertiary Care Hospital in Islamabad, Pakistan, 2019. *Preventing Chronic Disease*, *20*, 1–14.https://doi.org/10.5888/PCD20.220231

Pan, J., E. al. (2019). Determinants of hypertension treatment adherence among a Chinese population using the therapeutic adherence scale for hypertensive patients. Medicine [revista en Internet] 2019 [acceso 19 de setiembre de 2021]; 98(27): 1-7. *Medicine*, *98*(279e16116)), 1–7. https://journals.lww.com/mdjournal/fullt ext/2019/07050/determinants_of_hyperte nsion_treatment_adherence.27.aspx#O3-27-3

Perhimpunan Dokter Hipertensi Indonesia

Viva Medika: Jurnal Kesehatan, Kebidanan, dan Keperawatan, 17 (02), July 2024
Silma Kaaffah, et. al. (Determinants of Medication Adherence in Hypertension Patients
in Level I Health Facilities in Kembaran District)

(PERHI). (2021). KONSENSUS PENATALAKSANAAN HIPERTENSI 2021: Update Konsensus PERHI 2019. In *Indonesian Society Hipertensi Indonesia*. http://www.inash.or.id/upload/event/event_Update_konsensus_2019123191.pdf

Pramesti, A., Ichsan, B., Romadhon, Y. A., & Dasuki, M. S. (2020). Faktor-Faktor Penyebab Ketidakpatuhan Berobat Penderita Hipertensi di Wilayah Kerja Puskesmas Kartasura: Studi Kualitatif. *Proceeding Book Call for Paper Thalamus: Medical Research For Better Health In Pandemic*, 117–129. https://publikasiilmiah.ums.ac.id/handle/11617/12436

Pui, E., & Choi, H. (2019). *A Pilot Study to Evaluate the Acceptability of Using a Smart Pillbox to Enhance Medication Adherence Among Primary Care Patients*.

Riskesdas Kementrian Kesehatan RI. (2018). Laporan Riskesdas 2018 Nasional.pdf. In *Lembaga Penerbit Balitbangkes*.

Sammulia, S.F., et.al. (2016). Perbandingan Pill Box Dan Medication Chart Dalam Meningkatkan Kepatuhan Dan Outcome Klinik Geriatri Kota Batam. *Jurnal Manajemen Dan Pelayanan Farmasi*, *6*(4), 288–296.

Unger, T., E. al. (2020). 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*, *75*(6), 1334–1357. https://doi.org/10.1161/HYPERTENSIONAHA.120.15026

World Health Organization. (2023). *Global Report on Hypertension: The Race Against a Silent Killer* (World Health Organization (ed.)). World Health Organization. https://www.who.int/publications/i/item/9789240081062

Zhou, B., Carrillo-Larco, R. M., Danaei, G., Riley, L. M., Paciorek, C. J., Stevens, G. A., Gregg, E. W., Bennett, J. E., Solomon, B., Singleton, R. K., Sophiea, M. K., Iurilli, M. L. C., Lhoste, V. P. F., Cowan, M. J., Savin, S., Woodward, M., Balanova, Y., Cifkova, R., Damasceno, A., … Zuñiga Cisneros, J. (2021). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *The Lancet*, *398*(10304), 957–980. https://doi.org/10.1016/S0140-6736(21)01330-1